

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Patent Application of:

Ji Hwan KEUM et al.

Application No. 11/619,512

Group Art Unit: 1763

Filed: July 16, 2003

Examiner: Richard R. Bueker

For: MICRO-LENS BUILT-IN VERTICAL CAVITY SURFACE EMITTING LASER

APPEAL BRIEF

Mail Stop: Appeal Brief – Patents
Commissioner for Patents
PO Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Appellant's earlier filed Notice of Appeal on August 14, 2007, Appellant hereby appeals to the Board of Patent Appeals and Interferences from the final rejection mailed June 6, 2007. Appellant submits this Appeal Brief along with the filing fee of \$500.00 set forth in 37 C.F.R. §41.20(b)(2).

I. Real Party in Interest

Due to the assignment to Samsung NEC Mobile Display Co., Ltd. executed on June 27, 2003 by the inventors Ji Hwan KEUM, Chang Soon JI, Hyung Min KIM, and Sung Tae NAMGOONG, and recorded in the United States Patent and Trademark Office at Reel 014284, Frame 0062, the assignment from Samsung NEC Mobile Display Co., Ltd. to Samsung OLED Co., Lt. executed on June 10, 2004 and recorded in the United States Patent and Trademark Office at Reel 015486, Frame 0952, and the assignment from Samsung OLED Co., Ltd. to Samsung SDI Co., Ltd, executed on April 1, 2005 and recorded in the United States Patent and Trademark Office at Reel 016540, Frame 0121, the real party in interest is as follows:

Samsung SDI Co., Ltd.
575, Shin-dong, Yeongtong-gu,

Suwon-si, Gyeonggi-do
Republic of Korea

II. Related Appeals and Interferences

Although the real party in interest has other appeals and interferences, none of the other pending appeals and interferences is believed to directly affect or be directly affected by, or have any bearing upon the decision of the Board of Patent Appeals and Interferences in this appeal.

III. Status of Claims

The status of the claims of the application is as follows:

Claims 1, 2, 6 – 12, 16 – 19, 21 – 26, 32, 33 and 35 - 37: rejected.

Claims 3 – 5, 13 – 15, 27 – 31 and 34: canceled.

Claims 1, 2, 6 – 12, 16 – 19, 21 – 26, 32, 33 and 35 - 37 are the subject of this appeal.

IV. Status of Amendments

No amendments have been filed since the final Office Action of June 6, 2007.

A copy of the claims involved in the appeal is included in Appendix A.

V. Summary of the Invention

Aspects of the present invention are directed to a heating crucible for a deposition apparatus. In particular, the heating crucible according to claim 1 comprises a main body having a space that receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged (FIGs. 2 and 3; page 3, lines 26 – 28). The nozzle is defined in an upper wall of the main body (FIGs. 2 and 3). Fixing portions are suspended from an inner wall of the main body and an inner member is supported at positions along an outer circumference thereof by the fixing portions to face the nozzle (FIGs 2 and 3; page 6, lines 13 – 21). The inner member has one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions (FIG. 2; page 6, lines 1 – 2).

Borders of the openings are defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings (FIG. 2; page 6, lines 1 – 2).

A deposition apparatus for forming a deposition film on a substrate according to independent claim 11 comprises a vacuum chamber that receives the substrate and a heating crucible which is installed opposite to the substrate and vaporizes an organic compound provided thereto (FIG. 1; page 5, lines 14 – 24). The heating crucible comprises a main body having a space that receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in an upper wall of the main body (FIGs. 2 and 3; page 3, lines 26 – 28). Fixing portions are suspended from an inner wall of the main body, and an inner member is supported at positions along an outer circumference thereof by the fixing portions to face the nozzle (FIGs 2 and 3; page 6, lines 13 – 21). The inner member has one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions. The borders of the openings are defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings (FIG. 2; page 6, lines 1 – 2).

A method of producing an electroluminescent (EL) device having an organic compound according to claim 32 comprises obtaining a substrate of the EL device ((FIG. 1; page 5, lines 14 – 24) and depositing a layer of the organic compound on the substrate using a deposition apparatus (page 7, lines 1 – 7) having a heating crucible including a main body that receives the organic compound, a nozzle defined in an upper wall of the main body, fixing portions

suspended from an inner wall of the main body, and an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle (FIGs 2 and 3; page 6, lines 13 – 21). The inner member has one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings (FIG. 2; page 6, lines 1 – 2). The method further includes deflecting the transmitted organic compound via the upper wall of the main body (page 7, lines 16 – 20).

A heating crucible for a deposition apparatus according to claim 35 comprises a main body having a space therein defined by a cylindrical wall and an upper wall which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body (FIGs. 2 and 3; page 3, lines 26 – 28). The heating crucible further includes fixing portions suspended from an inner wall of the main body and a baffle board parallel with the upper wall, having one or more separate openings formed therein, that is supported by the fixing portions at positions along an outer circumference of the baffle board between the openings, borders of the openings being defined by notches in the outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through the one or more openings (FIGs 2 and 3; page 6, lines 13 – 21).

A deposition apparatus for forming a deposition film on a substrate according to independent claim 36 comprises a vacuum chamber which receives the substrate and a heating crucible that is installed opposite to the substrate and vaporizes an organic compound provided

thereto (FIG. 1; page 5, lines 14 – 24). The heating crucible comprises a main body having a space therein defined by a cylindrical wall and an upper wall that receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body (FIGs. 2 and 3; page 3, lines 26 – 28). The heating crucible further includes fixing portions suspended from an inner wall of the main body and a baffle board parallel with the upper wall, having one or more separate openings formed therein, that is supported by the fixing portions at positions along an outer circumference of the baffle board between the openings, borders of the openings being defined by notches in the outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through the one or more openings (FIGs 2 and 3; page 6, lines 13 – 21).

A heating crucible for a deposition apparatus according to independent claim 37, comprises a main body having a space therein defined by a cylindrical wall and an upper wall which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body (FIGs. 2 and 3; page 3, lines 26 – 28) and baffle board parallel with the upper wall that is supported by an edge of the wall of the main body, to define a plurality of separate openings bordered by a notched outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough. The upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through the one or more openings (FIGs 2 and 3; page 6, lines 13 – 21).

VI. Grounds of rejection

1. Whether claims 1, 2, 6 – 12, 16 – 19, 22 – 26 and 35 - 36 are patentable under 35 U.S.C. §103 over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589).
2. Whether claim 21 is patentable under 35 U.S.C. §103 over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589) and further view of Tiedje (U.S. Patent No. 5,944,903).
3. Whether claims 32 and 33 are patentable under 35 U.S.C. §103 over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589) and further view of Spahn (U.S. Patent No. 6,237,529).

VII. Arguments

1. **Claims 1, 2, 6 – 12, 16 – 19, 22 – 26 and 35 - 36 are patentably distinguishable over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589).**

The combination of Mori, Mashita and Morioka does not teach all of the limitations of independent claims 1, 11, 32 and 35 – 36. As review, claim 1 relates to a heating crucible for a deposition apparatus, comprising a main body having a space which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in an upper wall of the main body; fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle, the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings. Independent claims 11 and 35 – 36 relate to a deposition

apparatus, a heating crucible and a deposition apparatus, respectively and each includes the limitation of a heating crucible that has a main body and fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions and the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions.

Contrary to what is alleged by the Examiner, Mori, Mashita and Morioka, singly or combined, do not teach or suggest fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions and the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions. Instead, Mori describes the shielding material 4 supported by the stepped portion 1b of the device. The stepped portion 1b is nothing more than a step in the inner wall of the device on which the shielding material 4 lies. It does not include fixing portions as in the claimed invention, nor is the shielding material 4 suspended from an inner wall of the device by fixing portions as in the claimed invention.

Similarly, Morioka describes shielding plates 2 that are supported by protrusion portions 3 that are similar in form and function to the stepped portion disclosed by Mori. Morioka does not describe fixing portions suspended from an inner wall as in the present claims.

Mashita, referring to FIG. 4, describes a lid 3 in a crucible 2 that rests on support parts 6 that are similar in form and function to the stepped portion disclosed by Mori. Contrary to what is alleged by the Examiner, there is no information in Mashita that would lead one to conclude that these support parts are fixing portions suspended from an inner wall. There is no information provided in Mashita regarding exactly how the support parts are provided in the crucible of Mashita, and the only depiction of the support parts is the cross-sectional view of the crucible

provided in FIG. 4. Even taking into account the Examiner's alleged definition of the terms "hang" and "suspend," there is simply no teaching in Mashita to support the allegation that Mashita teaches fixing portions suspended from an inner wall. In particular, the dictionary referred to by the Examiner (Webster's Ninth New Collegiate Dictionary, Merriam-Webster, 1986, pages 551 and 1189) defines "suspend" as "to hang so as to be free on all sides except at the point of support" and defines "hang" as "to fasten to some elevated point without support from below." (The particular sub-definition 4 "to apply to a wall" mentioned by the Examiner is clearly indicated in the definition as being in the context of applying wallpaper.) There is nothing in Mashita that would teach or suggest that the support parts hang or are suspended from the wall of the crucible.

Therefore, the rejection of claims 1, 2, 6 – 12, 16 – 19, 22 – 26 and 35 - 36 under 35 U.S.C. §103 over Mori, Morioka and Mashita should be reversed.

2. Claim 21 is patentably distinguishable over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589) and further in view of Tiedje (U.S. Patent no. 5,944,903).

Claim 21 relates to the heating crucible of claim 1 and further requires a temperature sensing unit that senses a temperature of the organic compound that is received in the main body.

As discussed above, claim 1, from which claim 21 depends, is patentable over Mori, Mashita and Morioka, singly or combined. Tiedje merely describes a method of measuring a crucible temperature and does not overcome the failure of Mori, Mashita and Morioka to teach or suggest a heating crucible that has a main body and fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions and the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of

the fixing portions.

Therefore, the rejection of claim 21 under 35 U.S.C. §103 over Mori, Morioka and Mashita and further in view of Tiedje should be reversed.

3. Claims 32 and 33 are patentably distinguishable over Mori (JP 61-156809) in view of Mashita (JP 60-043480) and Morioka (JP 61-132589) and further in view of Spahn (U.S. Patent no. 6,237,529).

As review, independent Claim 32 relates to a method of producing an electroluminescent device having an organic compound, the method comprising obtaining a substrate of the EL device; depositing a layer of the organic compound on the substrate using a deposition apparatus having a heating crucible including a main body which receives the organic compound, a nozzle defined in an upper wall of the main body, fixing portions suspended from an inner wall of the main body, and an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle, the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings; and deflecting the transmitted organic compound via the upper wall of the main body. In particular, claim 32 requires using a deposition apparatus having a heating crucible that has a main body and fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions and the inner member having one or more separate openings formed

therein along the outer circumference thereof and between the supporting positions of the fixing portions.

As discussed above with respect to claims 1, 11, and 35 – 36, Mori, Mashita and Morioka, singly or combined, do not teach or suggest fixing portions suspended from an inner wall of the main body; an inner member supported at positions along an outer circumference thereof by the fixing portions and the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions. Spahn was applied by the Examiner for its alleged teachings relating to using an evaporation crucible to deposit a layer of an organic electroluminescent coating material on a substrate and does not overcome the deficiencies of Mori, Mashita and Morioka.

Therefore, the rejection of claim 21 under 35 U.S.C. §103 over Mori, Morioka and Mashita and further in view of Spahn should be reversed.

IX. Conclusion

In view of the law and facts stated herein, the Appellant respectfully submits that the Examiner has failed to cite a reference or combination of references sufficient to maintain obviousness rejections of the rejected claims.

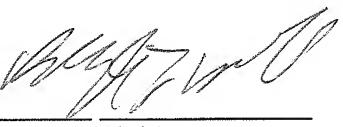
For all the foregoing reasons, the Appellant respectfully submits that the cited prior art does not teach or suggest the presently claimed invention. The claims are patentable over the prior art of record and the Examiner's findings of unpatentability regarding claims 1, 2, 6 – 12, 16 – 19, 21 – 26, 32, 33 and 35 - 37 should be reversed.

The Commissioner is hereby authorized to charge any additional fees required in connection with the filing of the Appeal Brief to our Deposit Account No. 50-3333.

Respectfully submitted,

STEIN, MCEWEN & BUI LLP

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X. Appendix A

1. A heating crucible for a deposition apparatus, comprising:
 - a main body having a space which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in an upper wall of the main body;
 - fixing portions suspended from an inner wall of the main body;
 - an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle, the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings.
2. The heating crucible of claim 1, wherein:
 - the inner member further comprises a baffle board formed on the area that faces the nozzle, and
 - the one or more openings are formed around an edge of the baffle board.
6. The heating crucible of claim 1, wherein the one or more openings are formed at regular intervals around the edge of the inner member.
7. The heating crucible of claim 1, wherein a sum of areas of the one or more openings of the inner member is equal to or greater than an area of the nozzle.

8. The heating crucible of claim 1, wherein a distance between the nozzle and the inner member is from a radius of the nozzle to 9/10 of a distance between the nozzle and an inner bottom surface of the main body.

9. The heating crucible of claim 1, wherein the main body comprises a cap on which the nozzle is formed and a main body part in which the space is formed.

10. The heating crucible of claim 1, further comprising a heater which is provided to the main body and/or the nozzle.

11. A deposition apparatus for forming a deposition film on a substrate, comprising:
a vacuum chamber which receives the substrate; and
a heating crucible which is installed opposite to the substrate and vaporizes an organic compound provided thereto, wherein the heating crucible comprises:

a main body having a space which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in an upper wall of the main body;

fixing portions suspended from an inner wall of the main body;

an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle, the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a

transmission direction of the organic compound when the organic compound is transmitted through each of the openings.

12. The deposition apparatus of claim 11, wherein: the inner member further comprises a baffle board formed on the area that faces the nozzle, and the one or more openings are formed around the edge of the baffle board.

16. The deposition apparatus of claim 11, wherein a sum of areas of the one or more openings of the inner member is equal to or greater than an area of the nozzle.

17. The deposition apparatus of claim 11, wherein a distance between the nozzle and the inner member is from a radius of the nozzle and 9/10 of a distance between the nozzle and an inner bottom surface of the main body.

18. The deposition apparatus of claim 11, wherein the main body comprises a cap on which the nozzle is formed and a main body part in which the space is formed.

19. The deposition apparatus of claim 11, wherein the heating crucible further comprises a heater which is provided to the main body and/or the nozzle.

21. The heating crucible of claim 1, further comprising a temperature sensing unit which senses a temperature of the organic compound.

22. The heating crucible of claim 1, wherein:

the inner member further comprises a baffle board formed on the area that faces the nozzle, and

the baffle board is narrower than a sectional area of the space.

23. The heating crucible of claim 1, wherein the one or more openings have a predetermined area so as to prevent a pressure difference between a space below the inner member and a space above the inner member.

24. The heating crucible of claim 1 wherein the nozzle has a vertical axis that does not match with that of the opening so as to prevent the organic compound, in a predetermined form, from being transmitted through the nozzle.

25. The heating crucible of claim 1, wherein: the inner member further comprises a baffle board formed on the area that faces the nozzle, and the baffle board blocks the organic compound, in a form of a lump, from being transmitted through the nozzle.

26. The heating crucible of claim 1, wherein the inner member has a cross-section that is substantially the same as that of the space of the main body.

32. A method of producing an electroluminescent (EL) device having an organic compound, the method comprising:

obtaining a substrate of the EL device;

depositing a layer of the organic compound on the substrate using a deposition apparatus having a heating crucible including a main body which receives the organic compound, a nozzle defined in an upper wall of the main body, fixing portions suspended from

an inner wall of the main body, and an inner member supported at positions along an outer circumference thereof by the fixing portions to face the nozzle, the inner member having one or more separate openings formed therein along the outer circumference thereof and between the supporting positions of the fixing portions, borders of the openings being defined by separate notches in the outer circumference and the inner wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through each of the openings; and

deflecting the transmitted organic compound via the upper wall of the main body.

33. The method of claim 32, wherein the inner member prevents the organic compound, in a form of a lump, from being deposited on the substrate.

35. A heating crucible for a deposition apparatus, comprising:

a main body having a space therein defined by a cylindrical wall and an upper wall which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body;

fixing portions suspended from an inner wall of the main body;

a baffle board parallel with the upper wall, having one or more separate openings formed therein, that is supported by the fixing portions at positions along an outer circumference of the baffle board between the openings, borders of the openings being defined by notches in the outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through the one or more openings.

36. A deposition apparatus for forming a deposition film on a substrate, comprising:
a vacuum chamber which receives the substrate; and
a heating crucible which is installed opposite to the substrate and vaporizes an organic compound provided thereto, wherein the heating crucible comprises:

a main body having a space therein defined by a cylindrical wall and an upper wall which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body;
fixing portions suspended from an inner wall of the main body;
a baffle board parallel with the upper wall, having one or more separate openings formed therein, that is supported by the fixing portions at positions along an outer circumference of the baffle board between the openings, borders of the openings being defined by notches in the outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission direction of the organic compound when the organic compound is transmitted through the one or more openings.

37. A heating crucible for a deposition apparatus, comprising:
a main body having a space therein defined by a cylindrical wall and an upper wall which receives an organic compound and a nozzle through which the organic compound, vaporized, is discharged, the nozzle being defined in the upper wall of the main body; and
a baffle board parallel with the upper wall that is supported by an edge of the wall of the main body, to define plurality of separate openings bordered by a notched outer edge of the baffle board and the wall of the main body, so as to allow for a transmittance of the vaporized organic compound therethrough, wherein the upper wall is perpendicular to a transmission

direction of the organic compound when the organic compound is transmitted through the one or more openings.

Appendix B

There is no evidence submitted under CFR 1.130, 1.131, or 1.132 or any other evidence entered by the Examiner and relied upon by the appellant in the appeal.

Appendix C

There are no decisions that have been rendered by a court or the Board in the proceedings identified in the Related Appeals and Interferences section of the Brief that have any bearing on this appeal.